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TRAUMATIC CENTRAL CORD SYNDROME: A REFERRAL HOSPITAL STUDY

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ABSTRACT Central cord syndrome is the commonest type of incomplete cervical spine injury. Schneider et al in 1954, defined it as a clinical feature of disproportionately greater motor deficit in the upper limbs than the lower. In this study, 26 patients were selected for this prospective study on traumatic cervical spine injury, having more motor loss in the upper limbs following injury. Based on clinical status and radiological findings, 12 were operated and results at follow up at 6 weeks and 6 months were discussed.

KEYWORDS :

Introduction:

Central cord syndrome is the commonest among other types of incomplete spinal cord injuries like the Brown Sequard syndrome and anterior cord syndrome. As originally defined by Schneider, Cherry and Pantek, the central cord syndrome is characterized by motor impairment which is disproportionately greater in the upper limbs than in the lower, bladder dysfunction mostly urinary retention and a variable degree of sensory loss below the level of lesion. [1] It was postulated that this syndrome resulted from a hyperextension injury involving the central portion of the cord and associated neural tracts. They proposed the etiology of the spinal cord injury was due to damage to the central spinal cord neuronal tracts resulting from a sudden compression of the cord between the hypertrophic spondylotic disc, osteophyte complex and the buckled ligamentum flavum.

Central cord injury may result from several etiologies. Ishida and Tominaga, in a review of central cord injuries, noted that motor vehicle collisons, falls and diving injuries were the most common etiology. [2] The younger population (less than 50 years) suffered this type of injury as a result of severe spinal column traumatic injuries, whereas the older population (more than 50 years) affected by hyperextension injury in a spondylotic canal. [3]

Further recent analysis suggest that some patients without any acute bony fracture, spondylosis or, severe degenerative canal stenosis, suffer this type of injury resulting from acute cervical central disc herniations caused by a low velocity trauma. [4]

Schneider proposed the pathogenesis of the injury as a result of a hyperextension mechanism in the setting of a stenotic canal, with subsequent compression of the white mater tracts, due to a central hematomyelia of the gray mater. It has been seen that patients with central cord injuries without any bony injuries tend to have a significant canal stenosis due to pre existing spondylotic disease. [5] Ishida and Tominaga reported that the mean spinal canal diameter in patients with central cord injury was less than 14mm and the greater the degree of canal stenosis having poorer neurologic outcome. Previous theory that central cord injury was due to central spinal cord hematomyelia has been contradicted by MRI findings. Quencer et al noted that no patient had hemorrhage centrally causing mass effect, however hemorrhage may correlate with a worse injury. [6,7] Other proposed theoties of pathogenesis include vascular insult and subsequent ischemia, specifically, direct vertebral artery compression. [8]

MRI, specially T2 and Gradient echo images are the ideal investigation for this injury and hematomyelia correlates with poor neurologic recovery.

As with other incomplete spinal cord injuries, timely surgical decompression with or without reconstruction is logical although as yet unproven. Surgery provides a definitive management step, improves the impact of rehabilitation training. But treatment plan is based on the philosophy of early definitive management to minimize the overall morbidity, mortality and cost of care.

Patients and Method:

We collected the full clinical, radiological and therapeutic data of the patients admitted in our Institute in three years from January 2014 to December 2016, with cervical spinal cord injuries. Among total 184 cervical spinal injury patients, we selected 26 patients (14.13%), based completely on clinical examinations, who were having motor power of upper limbs were less than that of lower limbs at admission. We also studied the radiological (X-ray cervical spine-AP and Lateral and MRI) and therapeutic aspect of those patients and were followed up at our Out Patient Clinic at 6 weeks and 6 months. Age, sex, time interval between injury and admission, motor power using the MRC grade, neurological status using Frankel's grading, sphincteric involvement, types of injury as detected by X ray and MRI, associated injuries, therapeutic intervention were tabulated and was compared at follow up visits.

Result:

Among the patients, only 4 (15.38%) were female. We found that 42% patients were in the 40-49 years age group followed by patients of 50-59 years age (23%). Table-1 shows the age distribution of patients. Only two patients were admitted on the day of injury, 7 (26.9%) were admitted within 48 hours, 14 patients (53.8%) were admitted within 7 days of injury and rest came after a week.

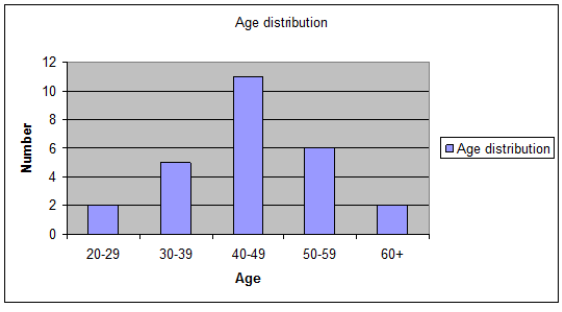


Table-1

Motor vehicle accidents were the most common (14 patients/53.8%) etiology of this injury. Rest was mainly falling from height and three patients (11.5%) sustained injury due to fall of heavy weight sac over neck. Regarding motor power, we excluded the quadriplegic patients from our study but all patients were having upper limb power less than that of the lower limbs. We administered Methyl Prednisolone as recommended in NASCIS-II trial in two patients who were admitted on the day of injury.

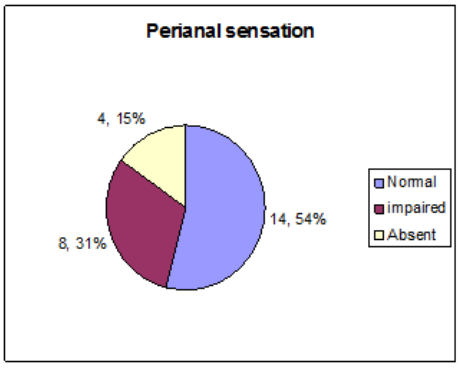
Table II.

Neurological assessment (Frankel et al. 1969)

Complete (A)	No motor power or sensation below the level of the lesion.
Sensory (B)	No motor power but some sensation below the level of the lesion.
Motor useless (C)	Some motor power below the level of lesion but of no functional use to the patient.
Motor useful (D)	Motor power of functional use below the level of the lesion ; the patient is able to walk with or without aids.
Recovery (E)	Full motor power, normal sensation and no sphincter

disturbance. although reflexes may be abnormal.

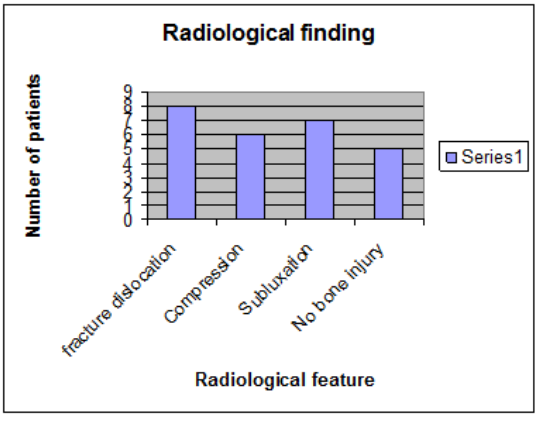
Among the 26 patients selected, 24(92.3%) were in the group C of Frankel's grade and the rest were in group D. Regarding sensory abnormalities we found that on admission, 14 patients (53.84%) had normal perianal sensation, in it was impaired in 8(30.76%) and was absent in four(15.38%).



In our study group, twenty (76.9%) patients were having some sphincteric involvement, mainly retention in 16 and incontinence in rest 4(20%), for which they were catheterized.

On the basis of X ray and MR imaging we found fracture dislocation of the cervical spine in 8(30.76%), single vertebral compression fracture in 6(23.07%), subluxation in 7(26.9%) and 5(19.2%) were without any bony injuries but having intramedullary signal changes in T2 weighted images.

Spinal canal diameter was measured in every cases based on MRI and we found the diameter was in the range of 8-10 mm in 17(65.38%) and 11-14 mm in the rest. The neurological status did not match every time with the sagittal diameter of the cervical spine and we found that the five patients without and bony injuries were having spinal diameter at least 12 mm but suffered more limb weakness due to cord contusion/ edema.



Associated injury:

Injury	Number
Head injury	4(15.38%)
Long bone fracture	3(11.53%)
Cheast injury	1(3.84%)
Facial injury	1(3.84%)

Therapeutic intervention: We performed surgery in 14 patients. All surgeries were by anterior cervical approach. Eleven patients were undergone single or two level corpectomy, graft placement and anterior spinal fixation, and three patients were undergone anterior cervical single level discectomy without fixation. The operative intervention was done within a range of 3-14 post injury days. Regarding post operative complications we got one patient with CSF leak in the minivac drain that stopped spontaneously without any treatment after 5 days, one patient with mild wound infection, three with catheter induced UTI during hospital stay. The mortality of our study was nil. All patients were discharged within 10-21 post operative days. We followed up the patients at 6 weeks and at 6 moths and at the end of 6 months we found post operative Frankel's grading of the patients are as

Grade E: 3, Grade D: 9 and Grade C: 2. Eleven patient were fully continent within 6 weeks of surgery, two were having returned bladder sensation at 6 months and one was catheter dependent even after 6 months follow up.

Conclusion:

The understanding of acute traumatic central cord injuryhas evolved over the last 50 years since this clinical disorder was defined by Schneider. It represents a heterogeneous group of traumatic spinal cord injured patients. First are younger patients(less than 50 years) with traumatic spinal column injuries and subsequent spinal instability, who require surgical stabilization of the spine . The second group also comprises a younger population (less than 50years) with an acute central cervical disc herniation who benefited from an acute decompression of the spinal cord, typically through an anterior approach . Lastly is the ''classic'' central cord injury in elderly patients(greater than 50 years) which presents a cord compression as the result of a stenotic spondylotic cervical canal without any fracture is evident . The patients may have some degree of recovery with medical treatment; however,surgical decompression of persistent cord compression or correction of spinal instability may be the best option so as to provide maximum neurologic recovery and prevent a delayed neurologic deficit.

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